#### PHYSIOLOGICAL INVESTIGATIONS

The work of a fishery laboratory includes much effort of a routine nature without evaluation of the reasons or principles behind the work. An excellent case in point concerns age and growth studies. On the species level, such studies are primarily concerned with the rates involved but not with the principles of growth, sensu strictu. Similarly, the biologist studies the food intake of various species, but not the intrinsic metabolic system that requires this energy input. These more general problems are basic and require research toward the end that the Woods Hole Laboratory may eventually understand the fish community as an interacting group of species living in, what may turn out to be, delicate adjustment, one to the other. Our needs for this investigation are clear--we need a measure of the metabolic rates, as measured by simple metabolic processes such as oxygen consumption, of the various ecologically important species of fishes. Food intake and growth are directly related to metabolism and both are of extreme importance in an understanding of a fish's role in its environment. Metabolic rates are controlled in large part by the environment, especially by its temperature, and are perhaps the principal factors to be considered when discussing the distribution and abundance of various species in a changing environment.

# PHYSIOLOGICAL INVESTIGATIONS

# List of Projects

- 1. Oxygen consumption of various groundfish species
- 2. Oxygen consumption changes in size change
- 3. Metabolic and food intake
- 4. Role of environment factors on spawning
- 5. Role of environment factors on aggregation

ACT. SCHEDULE SUMMARY CO

> Physiology Investigation:

Woods Hole, Mass. Biological Laboratory:

			Est.*					Fiscal	1 Years	rs			T
	Project Title		Cost	52	28	59	09	19		63	70	65	99
1. Oxygen consumption	of various groundfish	species	3/1.5	1	1	i	ł	13.6	10.7	10.2	!	1	1
2. Oxygen consumpt	2. Oxygen consumntion changes with size change		35.2		***		1	13.7			<b>_</b>	1	
3. Metabolic and food intake	food intake		68.1	1	1	!	ł	1			<u> </u>	2	
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	Annual Review			•	1						•	Date	
Laboratory	Regional or Area Office	Washington Office	ec	Pre	Prepared by:	by:	В		L. Edwards	ည်း		8/6/59	
				Reco	Recommended		i ja				•	Date	
				Lal	il	Lab. Director		erbe	Herbert W.	Gresham	u.		
				Reg	Reg. or	Area	Dir	5	1. M.	1. 124	としてい	<b>V</b>	A.
				$\mathbf{Br}_{\varepsilon}$	C	Chief		Ü					
				Appr	Approved by:	by:		/)					
							Divi	Division	Chief		for Director	tor	П
*Total needed by Labo	*Total needed by Laboratory for Project in theusands	nds of dollars.	•										

Total needed by Laboratory for Project in theusands of dollars.

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### U. S. Fish and Wildlife Service Bureau of Commercial Fisherics

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

# Research Project Outline

Title of Project:_	The seasonal $q_2$ co	nsumption of various	groundfish species
Investigation Title	: Physiology	gader Adallanagani kuminga dalamannaga kumingan dalamannaga kumingan engalaman engalaman ka	
Investigation Chie	f: R. L. Edwards		
Project Londor:	Vacant	Title	Grade
Assistants: (Title		11016	di ade
Cellaboraters:			
		varies with a change	e in temperature. It has

Need for Information: 02 consumption varies with a change in temperature. It has been demonstrated that, following acclimation, the curve of 02 consumption assumes a specific level, differing markedly from that at another acclimation temperature. A marked seasonal variation is therefore to be expected, whatever the ambient temperature. Since the oxygen requirement of not one of our major fish species is known, such work as this will supply much needed data even at the routine level of experimentation.

Objective: To determine seasonal variations in oxygen consumption.

#### Method of Procedure:

Phase 1:Using some such apparatus as the Seholander-Edwards respirometer, determine 0,2 consumption and 0,10 s for various temperatures at various seasons.

Phase 2:

Shoet No. 2

File No.:

Mothed of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total	Needed by Laborate	ory for Complete Project	34.5
	FY <u>1959</u>	FY 1960	FY 1961
Personal Scrvices Other Expenses:	P0 P0		2.5
Within Project		and have	2.5
Lab. Adm. & Ser.			8.6
Lab. Total	Date of the Control o	Date date.	13.6
Rogional Office Washington Office			.136
Total			
Recommended Source of Fu Estimated Date of Comple	(5-	K, Regular, Contributed	
Recommended by: Originator R. I	. Edwards	·	Date <b>8/6759</b>
Investigation Chief P	R. L. Edwards		8/6/59
Laboratory Director	Herbert W. Gr	aham	8/6/59
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Regional Director  Branch Chief	Joseph 4. Ven	are reac	8/19/59

### Remorks

(Continue on reverse side)

Suggest these studies be telayed, short those parts which can be carried out and francis investigations.

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### U. S. Fish and Wildlife Service Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

# Research Project Outline

Title of Project:(	2 Consumption cha	nges with changes i	in Mass
Investigation Title	: Physiology		
Investigation Chief	R. L. Edwards		
Project Leader:	Vacant Name	Title	Grade
Assistants: (Title	and Grade)		
Collaborators:			
Need for Information increases its mas will make possible	s. The nature of s	s decrease per unit uch a decrease, on anding of the nature	t of volume as an organism ce carefully documented, e of growth.
Objective: To dete	rmine the change in	n metabolic rates as	s fish increase their size.
Method of Procedure	e <b>:</b>		

Phase 1: Using respirometers, determine the  $\sigma_2$  consumption and the  $\sigma_{10}$  of a wide variety of sizes of various similarly acclimated species of fishes.

Phase 2:

Shoet No. 2

File No.:

Method of Procedure: (Cent'd)

Phase 3:

Estimated Casts: Tota	al Needed by Laborat	ory for Complete Project	35 <b>, 2</b>
	FY 1959	FY 1960	FY 1961
Personal Services Other Expenses:	, a. a.	and the	2.5
Within Project	and two		2,5
Lab. Adm. & Ser.	pos em.		8.7
Lab. Total		pad, was	13.7
Regional Office			.137
Total			**************************************
Recommended Source of F Estimated Date of Compl	. <b>(</b> S	-K, Regular, Contributed,	
Recommended by: Originator	R. L. Edwards		Date 8 <b>76759</b>
Investigation Chief	R. L. Edwards		8/6/59
Laboratory Director	Herbert W. Grah	am	8/ 6/59
Regional Director  Branch Chief	Joseph & Pu	moelier	8/19/59
Approved by: Division Chief for Di	rector		

### Remarks

(Continue on reverse side)

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